

What is claimed is:

1. A monoclonal antibody which specifically binds to the extracellular domain of the PSCA antigen.
2. The monoclonal antibody of claim 1 which binds to native PSCA as expressed on the surface of a human cell.
3. The monoclonal antibody of claim 1 which inhibits the growth of tumor cells which express PSCA.
4. The monoclonal antibody of claim 2, wherein the antibody is internalized by the cell.
5. A monoclonal antibody of claim 1, 2 or 3 which comprises murine antigen binding region residues and human antibody residues.
6. A monoclonal antibody of claim 1, 2 or 3 which is a human antibody.
7. A transgenic animal producing a monoclonal antibody of claim 6.
8. A monoclonal antibody selected from the group consisting of (a) monoclonal antibodies 1G8, 2A2, 2H9, 3C5, 3E6, 3G3 or 4A10, produced by the hybridomas designated HB-12612, HB-12613, HB-12614, HB-12616, HB-12618, HB-12615, and HB-12617, respectively, as deposited with the American Type Culture Collection; (b) a monoclonal antibody which competitively inhibits the binding of any of the monoclonal antibodies of (a); and (c) a monoclonal antibody which has the antigen binding region residues of any of the monoclonal antibodies of (a).
9. A hybridoma producing a monoclonal antibody of claim 8.

10. A recombinant protein comprising the antigen binding region of a monoclonal antibody of claim 8.

11. An Fab, F(ab')₂ or Fv fragment of a monoclonal antibody of claim 1 or 8.

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12. An immunotoxin which is a conjugate of a cytotoxic agent and a monoclonal antibody of claim 1 or 8.

13. An immunotoxin which is a conjugate of a cytotoxic agent and a monoclonal antibody of claim 5.

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14. An immunotoxin which is a conjugate of a cytotoxic agent and a monoclonal antibody of claim 6.

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15. An immunotoxin which is a conjugate of a cytotoxic agent and a recombinant protein of claim 10.

16. An immunoconjugate comprising a molecule containing the antigen-binding region of the monoclonal antibody of claim 1 joined to a therapeutic agent.

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17. The immunoconjugate of claim 16, wherein the therapeutic agent is a cytotoxic agent.

18. A method of inhibiting the growth of tumor cells expressing PSCA, comprising administering to a patient an antibody which binds specifically to the extracellular domain of PSCA in an amount effective to inhibit growth of the tumor cells.

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19. The method of claim 18, wherein said antibody is conjugated to a cytotoxic agent.

20. The method of claim 19, wherein said cytotoxic agent is a radioactive isotope.

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20. The method of claim 18, wherein said cytotoxic agent is selected from the group consisting of ricin, ricin A-chain, doxorubicin, daunorubicin, taxol, ethidum bromide, mitomycin, etoposide, tenoposide, vincristine, vinblastine, colchicine, dihydroxy anthracin dione, actinomycin D, diphtheria toxin, *Pseudomonas* exotoxin (PE) A, PE40, abrin, arbrin A chain, modeccin A chain, alpha-sarcin, gelonin, mitogellin, retstrictocin, phenomycin, enomycin, curicin, crotin, calicheamicin, sapaonaria officinalis inhibitor, and glucocorticoid.

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21. The method of claim 19, wherein said radioactive isotope is selected from the group consisting of ^{212}Bi , ^{131}I , ^{131}In , ^{90}Y and ^{186}Re .

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22. The method of claim 17, wherein said antibody is not conjugated to a cytotoxic agent.

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23. The method of claim 17, wherein said antibody is a monoclonal antibody.

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24. The method of claim 23, wherein the monoclonal antibody comprises murine antigen binding region residues and human antibody residues.

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25. The method of claim 23, wherein the monoclonal antibody is a humanized antibody.

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26. The method of claim 23, wherein the monoclonal antibody is a human antibody.

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27. The method of claim 17, wherein the tumor cells comprise human prostate carcinoma cells.

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28. The method of claim 17, wherein the tumor cells comprise a metastasis of a human prostate carcinoma.

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29. The method of claim 17, wherein the tumor cells comprise human bladder carcinoma cells.

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30. The method of claim 17, wherein the tumor cells comprise a metastasis of a human bladder carcinoma.

~~31~~³² The method of claim ~~17~~¹⁸, wherein the tumor cells comprise human pancreatic carcinoma cells.

5 ~~32~~³³ The method of claim ~~17~~¹⁸, wherein the tumor cells comprise a metastasis of a human pancreatic carcinoma.

~~33~~³⁴ The method of claim ~~17~~¹⁸, wherein said antibody is a monoclonal antibody of claim 8.

10 ~~34~~³⁵ The method of claim ~~17~~¹⁸, further comprising administering to the patient a chemotherapeutic drug.

~~35~~³⁶ The method of claim ~~17~~¹⁸, further comprising administering radiation therapy to the patient.

15 ~~36~~³⁷ A method of inhibiting the growth of tumor cells expressing PSCA, comprising administering to a patient a combination of monoclonal antibodies which bind specifically to PSCA antigen in an amount effective to inhibit growth of the tumor cells.

20 ~~37~~³⁸ The method of claim ~~36~~³⁷, wherein the combination of monoclonal antibodies comprise monoclonal antibodies of at least two different isotypes.

~~38~~³⁹ The method of claim ~~36~~³⁷, wherein the combination of monoclonal antibodies comprise monoclonal antibodies with different epitope specificities.

25 ~~39~~⁴⁰ The method of claim ~~36~~³⁷, wherein the combination of monoclonal antibodies comprises monoclonal antibodies 1G8, 2A2, 2H9, 3C5, 3E6, 3G3 and 4A10 produced by the hybridomas designated HB-12612, HB-12613, HB-12614, HB-12616, HB-12618, HB-12615, and HB-12617, respectively, as deposited with the American Type Culture Collection.

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40. The method of claim ~~36~~³⁷, wherein the combination of monoclonal antibodies is selected from the group consisting of Mab A2, 2H9, 3C5, 3E6, 3G3 and 4A10 produced by the hybridomas designated HB-12612, HB-12613, HB-12614, HB-12616, HB-12618, HB-12615, and HB-12617, respectively, as deposited with the American Type Culture Collection.

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41. A method of treating a patient susceptible to or having a cancer which expresses PSCA antigen, comprising administering to said patient an effective amount of an antibody which binds specifically to the extracellular domain of PSCA.

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42. The method of claim ~~41~~⁴² wherein said antibody is conjugated to a cytotoxic agent.

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43. The method of claim ~~42~~⁴³ wherein said cytotoxic agent is a radioactive isotope.

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44. The method of claim ~~42~~⁴³, wherein said cytotoxic agent is selected from the group consisting of ricin, ricin A-chain, doxorubicin, daunorubicin, taxol, ethidium bromide, mitomycin, etoposide, teniposide, vincristine, vinblastine, colchicine, dihydroxy anthracin dione, actinomycin D, diphtheria toxin, *Pseudomonas* exotoxin (PE) A, PE40, abrin, arabin A chain, modeccin A chain, alpha-sarcin, gelonin, mitogellin, retstrictocin, phenomycin, enomycin, curicin, crotin, calicheamicin, saponaria officinalis inhibitor, and glucocorticoid.

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45. The method of claim ~~43~~⁴⁴, wherein said radioactive isotope is selected from the group consisting of ²¹²Bi, ¹³¹I, ¹³¹In, ⁹⁰Y and ¹⁸⁶Re.

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46. The method of claim ~~41~~⁴², wherein said antibody is not conjugated to a cytotoxic agent.

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47. The method of claim ~~41~~⁴², wherein said antibody is a monoclonal antibody.

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48. The method of claim ~~47~~⁴⁸, wherein the monoclonal antibody comprises murine antigen binding region residues and human antibody residues.

~~50~~
~~49~~ The method of claim ~~47~~⁴⁸, wherein the monoclonal antibody is a human antibody.

~~51~~
~~50~~ The method of claim ~~47~~⁴⁸, wherein the monoclonal antibody is a humanized antibody.

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~~52~~
~~51~~ The method of claim ~~41~~⁴², wherein the tumor cells comprise human prostate carcinoma cells.

~~53~~
~~52~~ The method of claim ~~41~~⁴², wherein the tumor cells comprise a metastasis of a human prostate carcinoma.

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~~54~~
~~53~~ The method of claim ~~41~~⁴², wherein the tumor cells comprise human bladder carcinoma cells.

~~55~~
~~54~~ The method of claim ~~41~~⁴², wherein the tumor cells comprise a metastasis of a human bladder carcinoma.

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~~56~~
~~55~~ The method of claim ~~41~~⁴², wherein the tumor cells comprise human pancreatic carcinoma cells.

~~57~~
~~56~~ The method of claim ~~41~~⁴², wherein the tumor cells comprise a metastasis of a human pancreatic carcinoma.

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~~58~~
~~57~~ The method of claim ~~41~~⁴², wherein said antibody is a monoclonal antibody of claim 8.

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~~58~~ The method of claim ~~41~~⁴² further comprising administering to the patient a chemotherapeutic drug.

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~~60~~
~~59~~ The method of claim ~~41~~⁴² further comprising administering radiation therapy to the patient.

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~~60~~ The method of claim ~~41~~⁴², wherein said antibody is administered intravenously.

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~~61~~⁶² The method of claim ~~31~~⁵², wherein said antibody is administered directly into the prostate.

~~62~~⁶³ The method of claim ~~33~~⁵⁴, wherein said antibody is administered directly into the bladder.

5 ~~63~~⁶⁴ The method of claim ~~55~~⁵⁶, wherein said antibody is administered directly into the pancreas.

~~64~~⁶⁵ The method of claim ~~41~~⁴², wherein said antibody is formulated with a pharmaceutically acceptable carrier.

10 ~~65~~⁶⁶ A method for selectively inhibiting the growth of a cell expressing PSCA antigen comprising reacting the immunoconjugate of claim 1 with the cell in an amount sufficient to inhibit the growth of the cell.

15 ~~66~~⁶⁷ A method for selectively inhibiting the growth of a cell expressing PSCA antigen comprising reacting the immunotoxin of claim ~~12~~¹³, ~~13~~¹⁴, ~~14~~¹⁵, ~~15~~¹⁶, and ~~16~~¹⁷ with the cell in an amount sufficient to inhibit the growth of the cell.

20 ~~67~~⁶⁸ The method of claim ~~65~~⁶⁶ or ~~66~~⁶⁷, wherein the cell so inhibited is killed.

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